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The Cosmopterigidae (Lepidoptera) of the Galápagos Islands, Ecuador

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The Cosmopterigidae (Lepidoptera) of the Galápagos Islands, Ecuador. - The Cosmopterigidae of the Galápagos Islands include eight species: *Cosmopterix attenuatella* (Walker, 1864), *C. yvani* sp. n., *C. madeleinae* sp. n., *C. galapagosensis* sp. n., *Pyroderces rileyi* (Walsingham, 1882), *Ithome volcanica* sp. n., *Periploca longipenis* sp. n., and *Periploca darwini* sp. n. The new species are described and all species are illustrated. *Cosmopteryx* [sic] *apiculata* Meyrick, 1922 is synonymized with *C. attenuatella*. *Cosmopterix galapagosensis* was reared on *Eleocharis mutata* (L.) Roem. & Schult. (Cyperaceae).

Key-words: Moths - Cosmopterigidae - Galápagos Islands - taxonomy - Cyperaceae – Coccoidea.

INTRODUCTION

The Cosmopterigidae include some of the most beautifully colored moths, particularly in the genus *Cosmopterix*. However, in recent years their attractiveness was not sufficient to generate much attention from lepidopterists interested in the Neotropical fauna, except for Becker (1984) and Hodges (1997), who provided lists of species. In the Neotropical Region the Cosmopterigidae contain about 130 species including the six described in the following pages. The life-history of only a few of them is known.

MATERIAL AND METHODS

In 1989 and 1992, I surveyed most of the Galápagos islands for five months, concentrating on micro moths. I collected about 230 specimens of Cosmopterigidae, mostly with a mercury-vapor lamp set in front of a white cotton sheet and powered by a small generator. Also, I reared one *Cosmopterix* species from *Eleocharis mutata* (L.) Roem. & Schult. (Cyperaceae). Forty-seven additional specimens were made available to me by L. Roque, C. Causton and T. Paulson of the Charles Darwin Research Station, Santa Cruz, Galápagos (ECCD). Among them was a species that I had not encountered during my survey. The Galápagos fauna of Cosmopterigidae now includes eight species.

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To determine the identity of the Galápagos Cosmopterigidae I compared specimens collected in the Galápagos with the type specimens of the species described from the Nearctic and Neotropical regions available at the National Museum of Natural History, Washington, D.C. (USNM), at The Natural History Museum, London (BMNH), and at the Cornell University Insect Collection, Ithaca, New York (CUIC), or with specimens identified by R.W. Hodges (USNM) for a few North American species for which I did not see the holotype. These collections contained the specimens I needed to examine except for the types of two Neotropical *Cosmopterix* species. These types belong to the Naturhistorisches Museum Wien (NMW), and they had been borrowed by J.C. Koster of The Netherlands, who is revising the Neotropical fauna of Cosmopterigidae. With the descriptions and illustrations I sent to Mr. Koster, he determined that the two *Cosmopterix* species are different from those present in the Galápagos, and he confirmed my suspicion that three of the Galápagos *Cosmopterix* species were undescribed.

For examination of the genitalia the specimens were dissected in a concentrated (20%) hot KOH solution. Dissected parts were kept in lactic acid stained with orange G for examination and illustration purposes. They were subsequently stained in chlorazol black before being mounted on slide in Euparal.

Genitalia were sketched with a camera lucida mounted on a compound microscope. The drawings were finished in pencil with a stereo-microscope, inked and scanned at high resolution. The resulting electronic files were cleaned in Adobe Photoshop and grouped on plates with Adobe Illustrator before being printed.

The specimens treated here will be deposited in the "Muséum d'histoire naturelle," Geneva, Switzerland (MHNG), my personal collection (BLC), the BMNH, the Canadian National Collection of Insects and Arachnids (CNC), the collection of the ECCD, and the USNM.

SYSTEMATIC TREATMENT

Cosmopterix Hübner

Redescribed by Hodges (1978), this cosmopolitan genus includes about 200 species (J.C. Koster, pers. comm.).

Key to the *Cosmopterix* species of the Galápagos Islands

1 Forewing base (before fascia) brown with thin longitudinal white lines 2

1' Forewing base either brown on costal half and orange on inner half, or brown with a large longitudinal yellow stripe and thinner white lines 3

2(1) Forewing's shining spots at base of fascia disconnected, spot on costal margin farther from middle of fascia than spot on inner margin; without dark-brown scales at margin of fascia and shining spots; base of inner margin with a thick white line; longitudinal white line beyond fascia complete (Fig. 1) . . . . . *yvani*

2' Forewing's shining spots at base of fascia forming united transverse band; with dark-brown scales at margins of fascia and shining spots; inner margin with one-scale thin white line beyond base; longitudinal white line beyond fascia usually interrupted in middle (Fig. 4) . . . *attenuatella*

3(1') Base of forewing brown on costal half, usually with a thin diagonal white line; inner half yellowish orange; without dark-brown scales bordering shining spots; longitudinal white line beyond fascia visible only at apex, if present (Fig. 3) . . . . . *galapagosensis*

3' Base of forewing brown on inner half; costal half with a large pale-yellow stripe and two longitudinal white lines; with dark-brown scales bordering shining spots; with longitudinal white line beyond fascia (Fig. 2) . . . . . *madeleinae*

Cosmopterix yvani sp. n. Figs 1, 9, 10

Holotype ♂, Ecuador: Galápagos, Pinta, ca. 50 m elev., 20.iii.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22680).

Paratypes, Ecuador: 10 ♂ from the Galápagos Islands, collected at MVL by B. Landry. 3 with same data as holotype (one dissected, slide BL 1138); 5 more from *Pinta*: 1, Plaja Ibbetson, 13.iii.1992; 1, Plaja Ibbetson, 14.iii.1992; 2, arid zone, 15.iii.1992; 1, 200 m elev., 16.iii.1992. *Floreana*, 1 (slide BL 1216), Las Cuevas, 23.iv.1992. *Isabela*, 1 (slide BL 1264), nr. Tagus Cove, 100 m elev., 21.v.1992. (MHNG, BLC, BMNH, CNC, ECCD, USNM).

Diagnosis. A unique feature of this species is the thick white line at the base of the forewing's inner margin.

Description. MALE (n=11) (figs 1, 9, 10). Head brown with three longitudinal white lines reaching posterior margin of head: one on each side from antenna along upper side of eye and one medially from about anterior margin of eye; with a few white scales before antenna; frons paler brown than occiput and shining. Haustellum and maxillary palpus pale beige. Labial palpus with six thin longitudinal stripes: three white and three brown on segment II, and two of each color on segment III. Antenna from apex with two dark-brown flagellomeres, two white, five dark brown, one white, one dark brown, two white, three dark brown sometimes with white scales ventrally, rest (including scape) longitudinally lined with white and dark brown but some flagellomeres may lack white scales of second row. Thorax brown with three thin longitudinal white lines: one on each side laterally on medial side of tegula, prolonging lateral white lines of head, and one medially from base to posterior margin. Foreleg coxa laterally dark brown at base to pale greyish brown toward apex, pale greyish brown medially; femur mostly dark brown, with three short white stripes apically, with pale greyish-brown stripe medially; tibia dark brown with longitudinal white stripe laterally; tarsomeres I-III as tibia, tarsomere IV without white, tarsomere V white apically. Midleg coxa beige; femur greyish brown with few white scales apically; tibia dark brown with diagonal white lines at base, middle, and apex; tarsomeres dark greyish brown dorsally, beige ventrally, with a few white or off-white scales at apex of tarsomeres I-III, and V. Hindleg coxa beige; femur beige laterally, greyish brown medially; tibia dark brown, laterally with longitudinal white stripe ventrally from base to median spines and beyond in diagonal toward dorsal edge, with

another thinner white line dorsally from base to about 1/3, and with ring of white apically, spines white to off-white, elongate scales on dorsal edge mostly dark brown except for off-white apical bunch; tarsomeres dorsally dark brown with some white scales, beige ventrally, tarsomere I white at base and apex, tarsomere II white apically, other tarsomeres white on most of lateral surface. Wingspan: 9.5-11.0 mm. Forewing base brown with five longitudinal white lines: one subcostal from middle to fascia; one from base below costa, slightly inclined toward middle of wing and ending shortly before fascia; one above cubital fold from about 2/5 to shortly before fascia; one shorter below fold from 1/2 to 4/5; and one on inner margin from base to about 4/5, thicker on basal half; yellow fascia from about 1/2 to about 4/5 wing length; four shining spots pinkish silver, two costal spots farther from middle of fascia than inner margin spots and not touching costa, inner margin spots bigger than costal spots and touching inner margin, with a few white scales on costa above costo-apical silver spot; brown area beyond fascia with median longitudinal white stripe from shortly beyond fascia to shortly before apex of wing; fringe brown, paler below fascia. Hindwing uniformly greyish brown with concolorous fringe. Abdomen dorsally mostly yellowish orange with brown at apex of segments; laterally greyish brown with beige at apex of apical segments; ventrally beige; thin scales surrounding genitalia greyish brown dorsally and beige ventrally.

Male genitalia (n=3) (figs 9, 10). Apex of right uncus arm enlarged to the left and with a dorsal longitudinal depression; projection anteriorly rounded, laterally flattened, and with short bumps on dorsal edge; apex pointed, dorso-ventrally flattened, and directed downward. Arms of juxta broadly down-curved, of same width for most of length, laterally compressed on distal third, apically pointed. Valvae short, enlarging apically to about twice the basal width; apical margin almost straight on dorsal half; apex rounded. Aedeagus short, larger and bulbous on basal half, slightly bent to the right from middle; baso-ventral flange of medium size, rounded; bulbus ejaculatorius equal in length to sclerotized part of aedeagus.

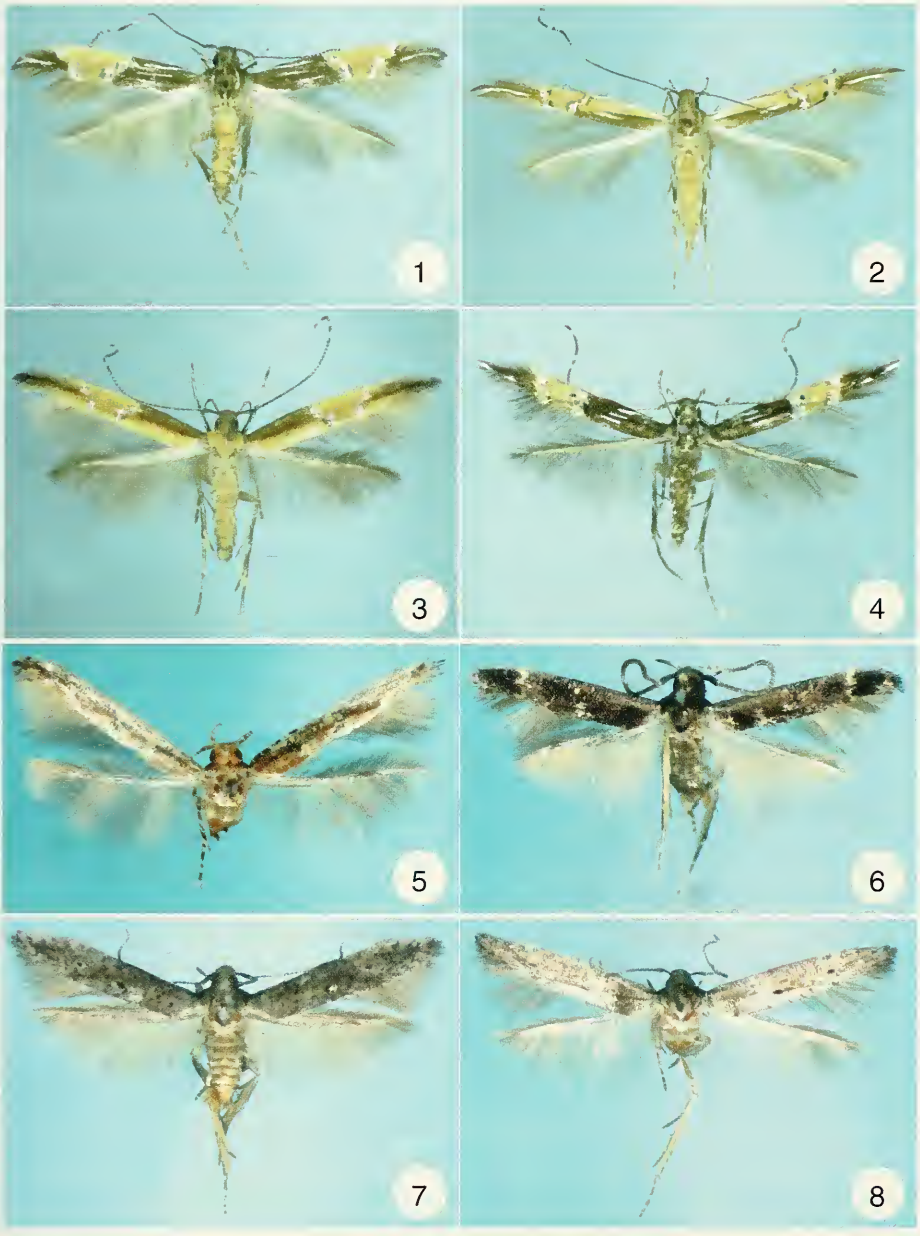
Female. Unknown.

Etymology. The specific epithet derives from the name of my father, Yvan Landry, especially for his encouragement along the path that led me to become a lepidopterist.

Biology. The host plant is unknown. Moths come to light and were found mostly at lower elevations, from March until May.

Distribution. Possibly endemic to the Galápagos where it was found on the islands of Floreana, Isabela, and Pinta.

Remarks. In describing the male genitalia of *Cosmopterix* species, authors such as Hodges (1978), Koster, and Sinev (S. Koster, pers. comm.) refer to the most dorsal structure as the right arm (or brachium) of the gnathos. However, in a subsequent paper Hodges (1999) mentioned that the Cosmopterigidae do not have a gnathos, without indicating what should be the name of this structure. I have contacted Dr. Hodges and he is now of the opinion that this structure is the right arm of the uncus because of the presence of a patch of setae at its base and at the base of the other very reduced arm (pers. comm.). This is the interpretation I have adopted. I have also adopted Hodges' (1978) interpretation and terminology for the arms extending above



FIGS 1-8

Adults of Cosmopterigidae species. 1. *Cosmopterix yvani*; 2. *C. madeleinae*; 3. *C. galapagosensis*; 4. *C. attenuatella*; 5. *Pyroderces rileyi*; 6. *Ithome volcanica*; 7. *Periploca longipenis*; 8. *P. darwini*.

the valva, calling them "arms of the juxta." However, Sinev (S. Koster, pers. comm.) refers to this structure as the "anellus arms" and Riedl (1969) as the free costa of the valva. My interpretation of the bulbus ejaculatorius comes from Sattler (1979).

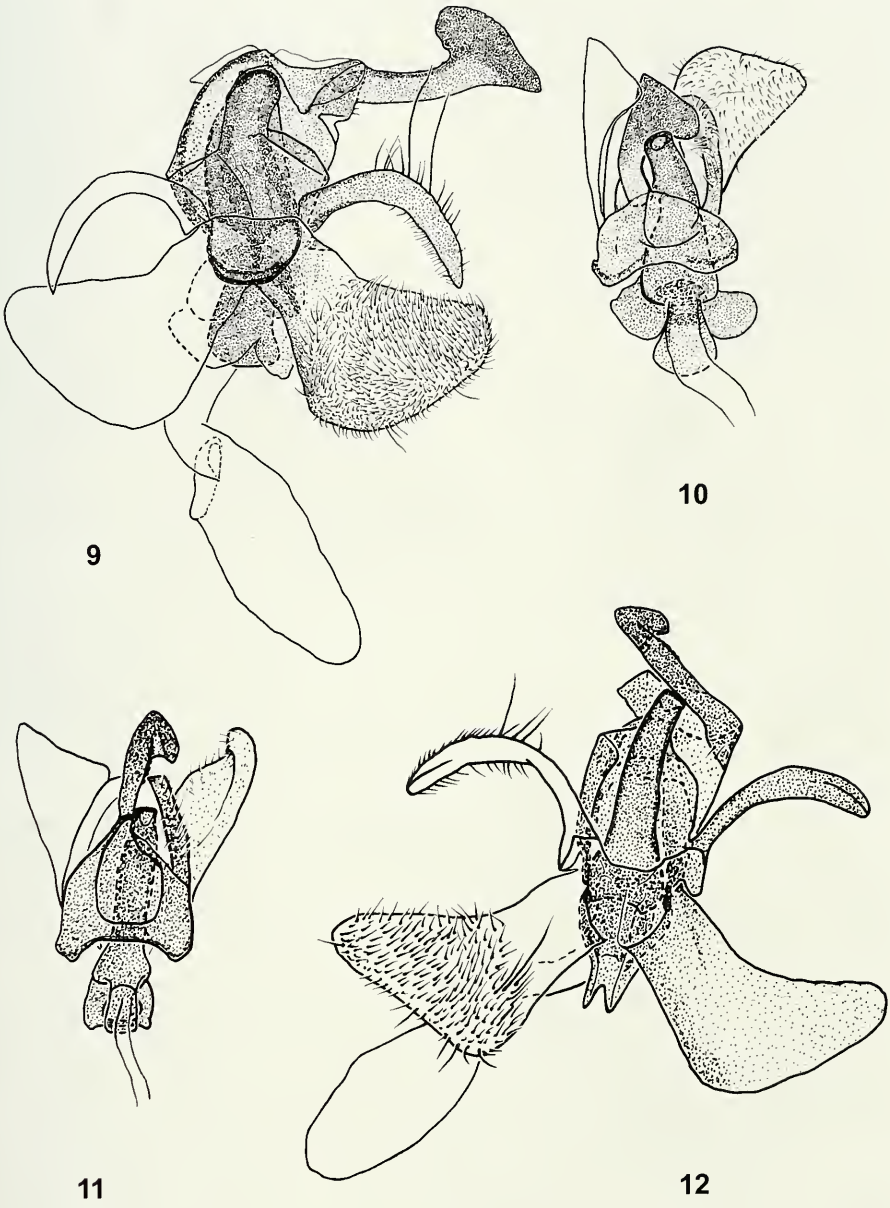
Cosmopterix madeleinae sp. n. Figs 2, 11, 12, 26

Holotype ♂, Ecuador: Galápagos, Santa Cruz, Los Gemelos, 27.v.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22681).

Paratypes, Ecuador: 30 ♂, 17 ♀, 1 of sex undetermined from the Galápagos Islands. *Isabela*: 2 ♀, Volcan Darwin, 1000 m elev. (B. Landry); 3 ♂ (slide BL 1262), 1 ♀ (slide BL 1260), Volcan Darwin, 1240 m elev., 19.v.1992, MVL (B. Landry); 1 ♀, ca. 15 km N Puerto Villamil, 25.v.1992, MVL (B. Landry); 1 ♂, 1 ♀, Volcan Alcedo, Cumbre, 1200 m elev., La Caseta, 9.iv.1999, U[ltra] V[iolet] L[ight]- F[luorescent] L[ight] (L. Roque); 1 ♂, 6 ♀ (slide BL 1259), 1 sex undetermined, Volcan Alcedo, 1100 m elev., 13.x.1998, UVL (L. Roque); 10 ♂, Volcan Alcedo, top, 1100 m, 16.x.1999, sweep net, asociado *Tournefortia* spp. (L. Roque). *Pinta*: 3 ♂ (slide BL 1141), 1 ♀, 400 m elev., 17 and 18.iii.1992, MVL (B. Landry). *San Cristóbal*: 1 ♀ (slide BL 1263), pampa zone, 18.ii.1989, MVL (B. Landry). *Santa Cruz*: 4 ♂ (slide BL 1261), 1 ♀, same data as holotype; 4 ♂, 3 ♀ (CNC slide MIC 4680), Los Gemelos, 31.i.1989, MVL (B. Landry); 4 ♂, Finca S[teve] Devine, 17.iii.1989, MVL (B. Landry). (CNC, ECCD, MHNG, BLC, BMNH, USNM).

Diagnosis. This species is recognizable by the pattern of the forewing base: this area is dark brown on the inner half of the wing and has a large pale-yellow longitudinal stripe bordered by white on the costal half.

Description. Male (n=31) (figs 2, 11, 12). Head brown to dark brown on occiput, with three thin longitudinal white lines reaching posterior margin of head: one on each side from antenna along upper side of eye and one medially from about anterior margin of eye; with few, if any, white scales before antenna; larger scales of vertex and frons greyish brown or yellowish brown, shining. Haustellum and maxillary palpus white to pale beige. Labial palpus with six thin longitudinal stripes: three white and three brown on segment II, and two of each color on segment III. Antenna from apex with two dark-brown flagellomeres, two white, five dark brown, one white, one dark brown, two with white second row and dark-brown first row, two to five mostly dark brown but with some white scales, three or four with white first row and dark-brown second row, about 15 mostly dark greyish brown with one or two white scales on first row, rest dark brown with one white stripe dorsally and one ventrally; scape dark brown with a white stripe dorsally and two more ventral beige stripes. Thorax dark brown with paler orange-brown scales apically, with three white longitudinal lines: one medially and two on medial side of each tegula. Foreleg coxa greyish brown laterally, beige medially; femur dark brown laterally with a white stripe apically, beige medially; tibia dark brown with a white stripe laterally, beige medially; tarsomeres dark brown to greyish brown dorsally with white on tarsomeres I-II, base of III, and V, mostly beige ventrally. Midleg coxa beige; femur medially beige, laterally beige at base, greyish brown apically: tibia laterally dark brown with white diagonal stripes at base (reaching middle dorsally), middle, and apex; tarsomeres mostly dark greyish brown dorsally, with white at apex of tarsomeres I-III and V, beige to greyish brown ventrally. Hindleg coxa and femur beige; tibia whitish beige medially, laterally dark brown with white as a large diagonal band from base to about 1/3, as a shorter larger diagonal band in middle from base of spines, and as

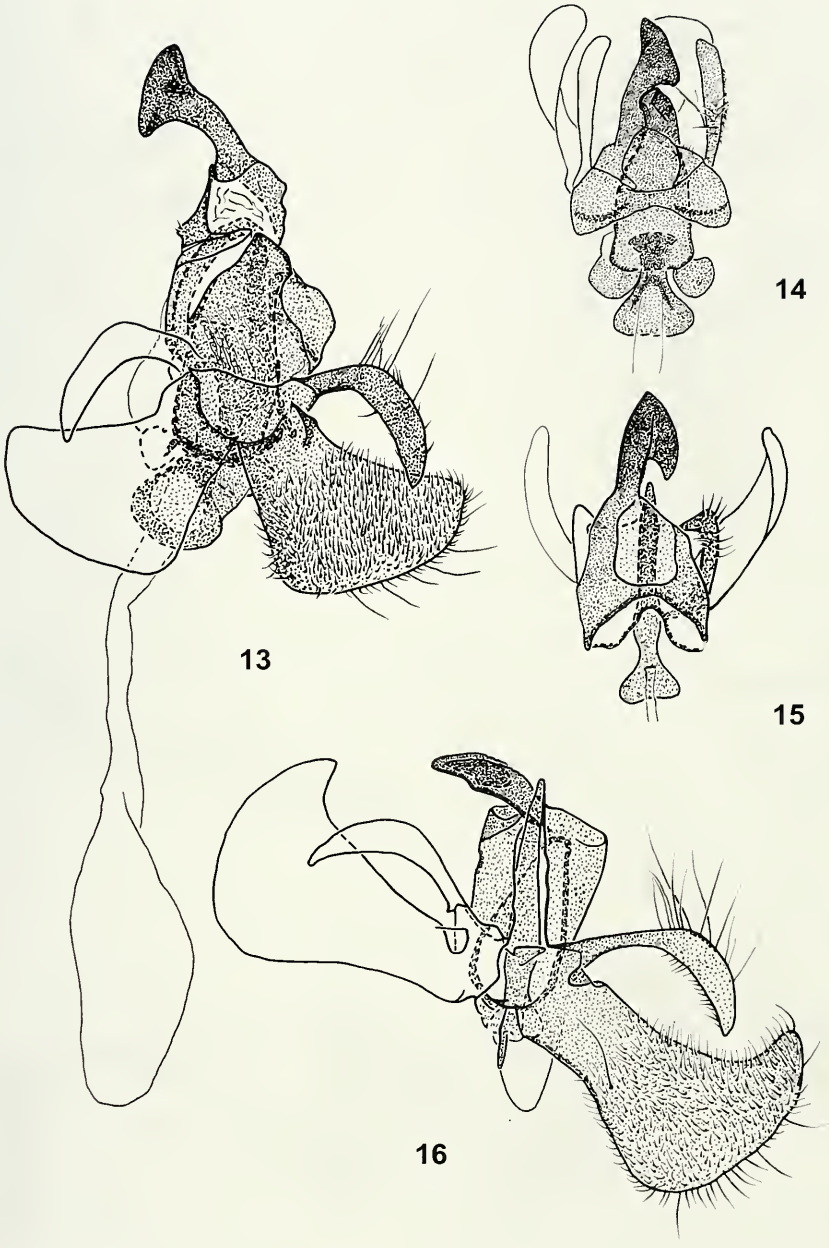


FIGS 9-12
Male genitalia of *Cosmopterix* species (10 and 11 are dorsal views). 9, 10. *C. yvani*; 11, 12. *C. madeleinae*.

rings subapically and apically, spines greyish brown and beige, elongate scales on dorsal edge mostly dark brown and white but yellow at apex; tarsomeres dorsally dark greyish brown with white at apex of tarsomeres I and II (sometimes also on III-V) and subbasally on tarsomere I, ventrally beige to greyish beige. Wingspan: 7.0-9.5 mm. Forewing base dark brown along costa as a thin line enlarging toward fascia and usually becoming paler brown, with white stripe of medium width not quite reaching fascia below costa, with a large pale-yellow (sometimes apically darker yellow to bronze colored) longitudinal band from base to fascia on costal side of cubital fold, usually with a thin white line on costal margin of yellow stripe toward the middle, mostly brown on inner side of cubital fold, with a short and straight white longitudinal bar subapically, and with a thin white line on inner margin from base to about 1/3; yellowish-orange to bronze-brown fascia from about 1/2 to about 7/10 wing length; four silvery-pink shining spots with a few dark-brown scales on basal margins, inner margin spots touching inner margin, costal spots not touching costal margin and farther from middle of fascia than inner margin spots, anterior spots often not connected to each other, posterior spots usually connected; apical area of wing mostly yellowish orange at base along inner margin and sometimes on all of base except for white scales on costa, dark brown beyond base with a longitudinal white stripe sometimes becoming pale yellow at apex or with yellow scales on its costal margin; fringe mostly pale yellow to pale brown along inner margin, dark brown toward apex. Hindwing pale greyish brown with a yellowish tinge toward apex sometimes; fringe pale greyish brown along inner margin, darker brown toward apex and on costa. Abdomen dorsally mostly yellowish orange except for beige or pale greyish-brown apical margin of segments; laterally mostly pale greyish brown but beige toward apical margin of segments; ventrally mostly beige; thin scales around genitalia pale yellowish beige.

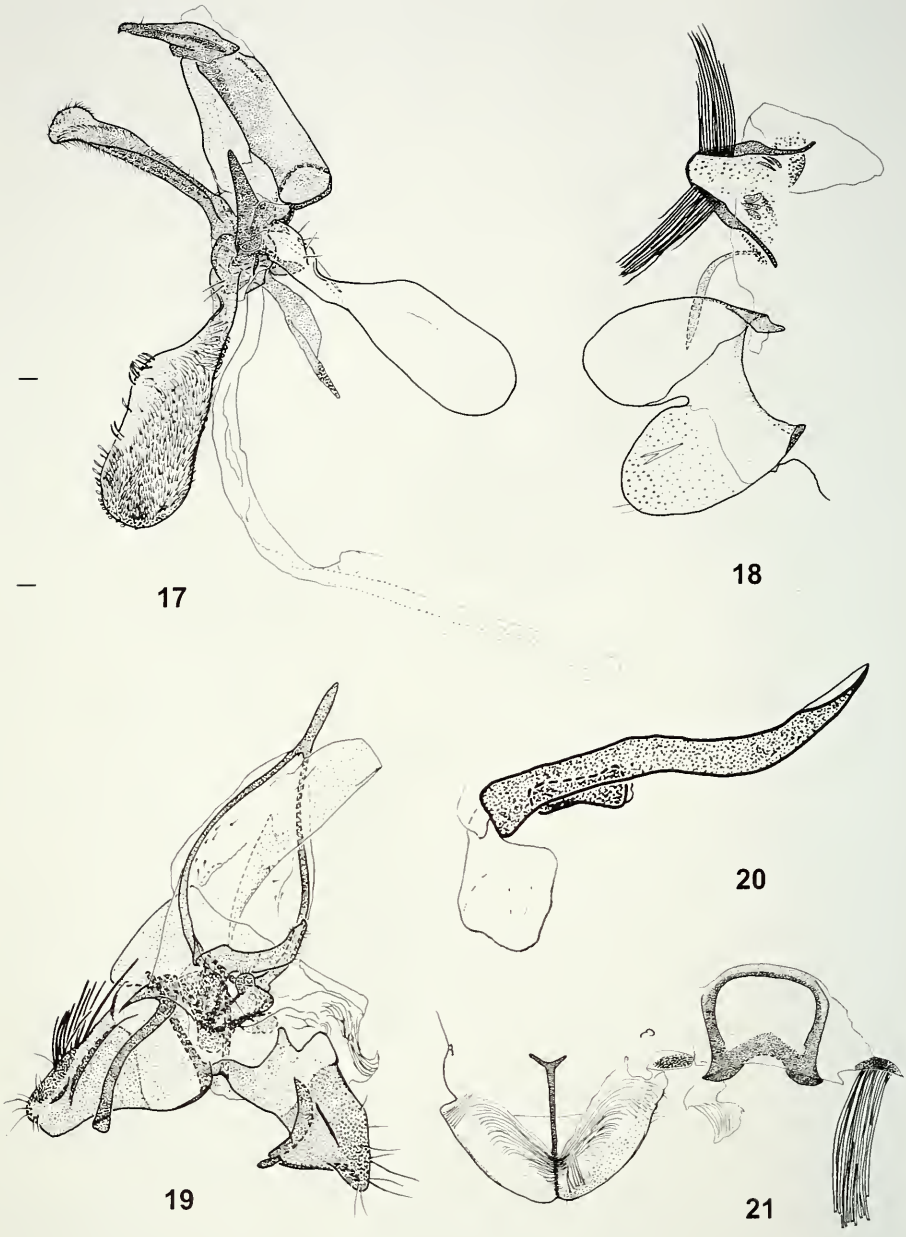
Male genitalia (n=3) (figs 11, 12). Right uncus arm shortly serrated dorsally toward apex; projection enlarged to the left, of medium size, and subtriangular (in dorsal view), rounded at apex and anteriorly, and with slightly concave margin basally; apex dorso-ventrally flattened; lateral margins slightly enlarged. Arms of juxta narrow, broadly down-curved, circular in cross section and of same girth for most of length; medial margin forming edge subapically; apically rounded. Valvae more or less L-shaped, wider in the middle; apical margin almost straight. Aedeagus rather narrow and straight for most of length, slightly enlarged and bulbous on basal 1/4, only slightly bent to right at apex; ventral flange absent, basoventral margin deeply concave; bulbus ejaculatorius about as long as sclerotized part of aedeagus.

Female (n=17). Wingspan: 7.0-11.0 mm. Frenulum with two acanthae. Sternum VII scales set in sinuous rows; posterior margin not modified, slightly concave. Female genitalia (n=4) (fig. 26). Papillae anales not elongate, rounded apically. Posterior and anterior apophyses slender and straight; anterior apophyses shorter than posterior apophyses by about 1/3, connected by slightly more melanized band along apical margin of tergum VIII. Ostium bursae surrounded by ring of sclerotization of which the antero-ventral part is slightly prolonged anteriorly. Ductus bursae very slender, with small and poorly sclerotized bend before inception of ductus seminalis,



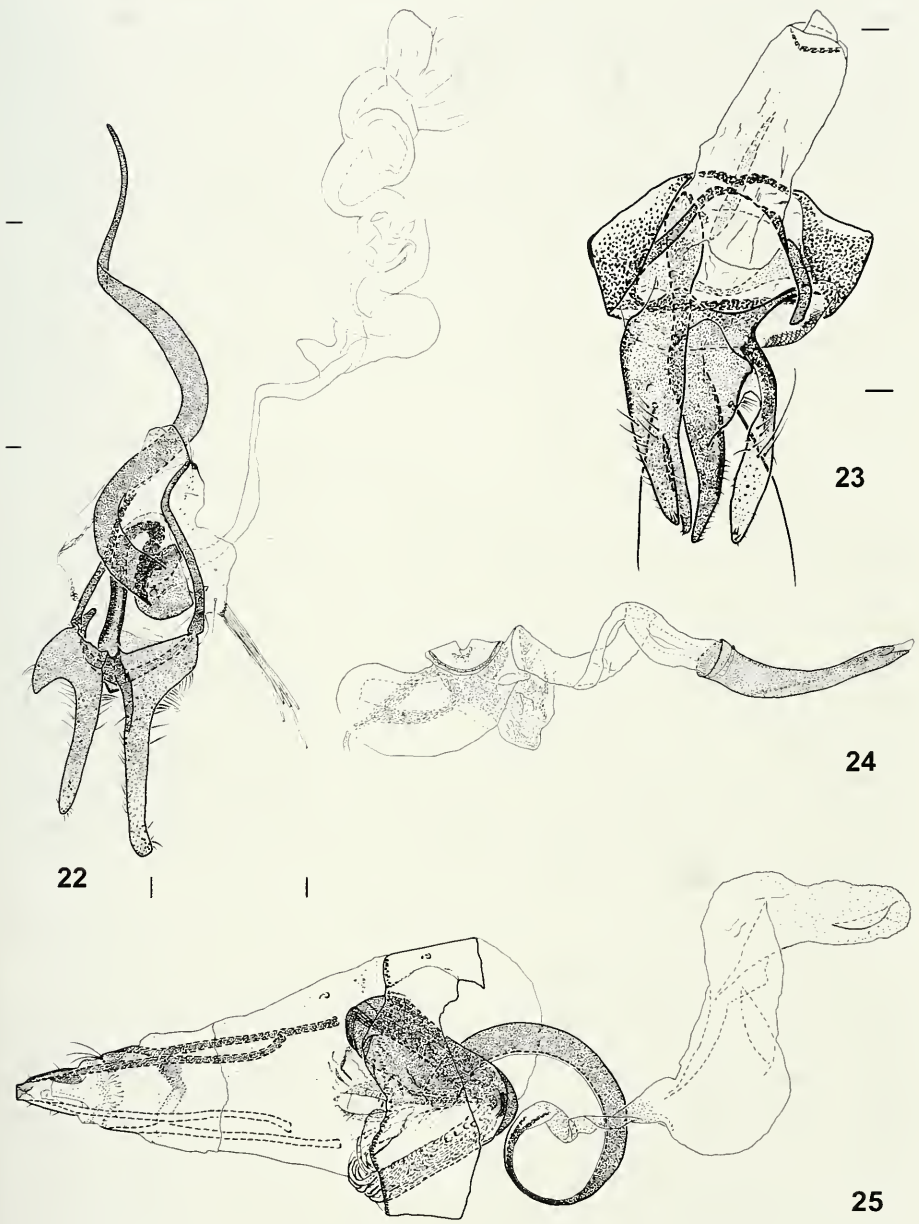
FIGS 13-16

Male genitalia of *Cosmopterix* species (14 and 15 are dorsal views). 13, 14. *C. galapagosensis* (scale = 0.5 mm); 15, 16. *C. attenuatella.*



FIGS 17-21

Male genitalia of Cosmopterigidae species. 17-18. *Pyroderces rileyi*:17. Whole genitalia (scale = 0.5 mm); 18. Abdominal segment VIII. 19-21. *Ithome volcanica*: 19. Genitalia without aedeagus; 20. Aedeagus; 21. Abdominal segment VIII.



FIGS 22-25

Genitalia of *Periploca* species (scales = 0.5 mm). 22. *P. longipenis*, male; 23-24. *P. darwini*, male: 23. Genitalia without aedeagus; 24. Aedeagus; 25. *P. longipenis*, female.

without distinct junction with corpus bursae. Corpus bursae slender and long, with slight curve subapically, without signum.

Etymology. I take pleasure in naming this species in honor of my mother, Madeleine Marois, for her love and encouragement to continue my work on Lepidoptera, especially when there seemed to be little hope that I could derive a decent living from it.

Biology. The host plant is unknown. Moths were taken only at higher elevations, in agriculture, scalesia, and pampa zones. They were taken at light or swept from the vegetation from January to May and in October.

Distribution. Possibly endemic to the Galápagos where it was found on the islands of Isabela, Pinta, San Cristóbal and Santa Cruz.

Remark. I found the dissymetric anal papillae shown on figure 26 on that specimen only.

Cosmopterix galapagosensis sp. n. Figs 3, 13, 14, 27

Holotype ♂, Ecuador: Galápagos, Santa Cruz, Los Gemelos, 27.v.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22682).

Paratypes, Ecuador: 26 ♂, 13 ♀ and 4 of sex undetermined (because the wings are not spread) from the Galápagos Islands and collected by B. Landry except otherwise indicated. *Isabela*: 2 ♂, 2 km W Puerto Villamil, 5.iii.1989, MVL; 1 ♂, 3 km N Santo Tómas, Agriculture zone, 8.iii.1989, MVL; 1 ♂, 11 km N Puerto Villamil, 9.iii.1989, MVL; 1 ♂, ca. 15 km N Puerto Villamil, 25.v.1992, MVL; 1 ♂, Volcan Darwin, 300 m elev., 15.v.1992, MVL; 1 ♂ (slide BL 1265), Volcan Darwin, 630 m elev., 17.v.1992, MVL; 1 ♂, Volcan Darwin, 1000 m elev., 18.v.1992, MVL; 1 ♂ (slide BL 1266), Volcan Darwin, 200 m, 11.ii.1999, UVL (L. Roque); 2 ♂, 1 ♀, Volcan Alcedo, cumbre, 1200 m elev., La Caseta, 9.iv.1999, UVL-FL (L. Roque). *San Cristóbal*: 1 ♂, 4 km SE Puerto Baquerizo, 12.ii.1989, MVL; 1 ♂ (slide BL 1142), 1 km S El Progreso, 14.ii.1989, MVL; 2 ♂, pampa zone, 18.ii.1989, MVL; 3 ♂, 4 km SE Puerto Baquerizo, 20.ii.1989, MVL; 2 ♂, base of Cerro Pelado, 22.ii.1989, MVL. *Santa Cruz*: 3 ♂, 9 ♀ (CNC slides MIC 4681 & 4683), Tortuga Bay, 29.i.1989, MVL; 1 ♂, 3 ♀, 4 of sex undetermined, Tortuga Bay, reared from *Eleocharis mutata* leaf, emerged 30.i.-8.ii.1989; 1 ♂, Media Luna, pampa zone, 21.i.1989, MVL; 1 ♂ (CNC slide MIC 4682), Media Luna, 8.ii.1989, MVL. (CNC, ECCD, MHNG, BLC, BMNH, USNM).

Diagnosis. This species can be recognized readily by the brown costal half and the yellowish-orange inner half of the forewing base.

Description. MALE (n=27) (figs 3, 13, 14). Head brown to orange brown on occiput, with three thin longitudinal white lines reaching posterior margin of head: one on each side from antenna along upper side of eye and one medially from about anterior margin of eye; with a few white scales before antenna; vertex and frons with large greyish-brown shining scales. Haustellum and maxillary palpus pale greyish beige. Labial palpus with six thin longitudinal stripes: three white and three brown on segment II, and two of the same colors on segment III. Antenna from apex with two dark-brown flagellomeres, two white, one dark brown, one white, one dark brown, two mostly white with some dark-brown scales, two or three mostly dark brown with white scales, two or three with white first row and dark-brown second row, about 20 with complete dark-brown second row and incomplete white first row, basal three and scape dark brown dorsally with two longitudinal white lines and a larger beige stripe ventrally. Thorax yellowish orange to orange brown, browner at base, with thin

longitudinal white line medially, sometimes with one or two white scales on medial margin of tegula. Foreleg coxa pale greyish brown; femur laterally dark brown on dorsal half, beige on ventral half, medially pale greyish brown, with longitudinal white stripe at apex dorsally; tibia laterally dark brown with a longitudinal white stripe, medially greyish beige; tarsomeres mostly greyish brown, with white dorsally as a longitudinal stripe on tarsomere I, at apex of tarsomere II, on all of tarsomere V, and sometimes on tarsomere III at apex. Midleg coxa greyish to yellowish beige; femur greyish beige basally to darker greyish brown toward apex, with a few white scales apically; tibia mostly greyish brown with diagonal white lines at base, middle, and apex; beige ventrally on tarsomeres I-V and dorsally at apex of last tarsomere, greyish brown elsewhere with white scales at apex of tarsomeres I and II dorsally. Hindleg coxa pale yellowish beige; femur entirely greyish beige; tibia dark brown with white as a short dorsal line at base, as a short stripe medially from base of spines, dorsally before apex, and at apex, spines whitish beige, elongate scales on dorsal edge dark brown except for a pale yellow bunch apically; tarsomeres greyish brown dorsally with white at apex of tarsomeres I-V but not always on IV, greyish brown to beige ventrally. Wingspan: 9.0-11.0 mm. Forewing base pale yellow to yellowish orange on inner half (on inner side of cubital fold), dark brown on costal half, usually with a thin diagonal white line from base on costa to beyond middle of brown basal area (often inconspicuous at base); pale-yellow to yellowish-orange fascia from about 2/5 to 7/10 wing length; four silvery-pink shining spots not touching wing margins, usually disconnected from each other along median line, costal spots farther from middle of fascia than inner margin spots, without dark-brown scales at spots' margins; apical area of wing mostly pale yellow to yellowish orange at base on costa and along inner margin, darker orange brown in middle, dark brown on most of costa and at apex, sometimes with thin longitudinal white line at apex; fringe brownish to yellowish beige along inner margin, brown and darker toward apex. Hindwing greyish brown; fringe mostly greyish brown, darker at apex but pale yellow at base of inner margin. Abdomen segments I-VI dorsally mostly yellowish orange, with pale greyish-brown apical margin; ventrally mostly greyish brown; slightly darker brown laterally; elongate scales surrounding genitalia pale yellow.

Male genitalia (n=4) (figs 13, 14). Apex of right uncus arm enlarged to the left by short and rounded laterally flattened knob, produced anterodorsally, and bearing short bumps on dorsal edge; apically flattened dorso-ventrally by subapical 90° upward bend of ventral margin; apex rounded in dorsal view but pointed in lateral view. Arms of juxta curved downward at almost right angle before middle, slightly enlarged (in lateral view) after bend, laterally compressed beyond middle, pointed apically. Valvae short, wide at base and widening to over twice the basal width; apical margin and apex broadly rounded. Aedeagus short, bulbous and larger on basal half, curved slightly to the right at apex; basoventral flange rather large, rounded; bulbus ejaculatorius almost twice the length of sclerotized part of aedeagus.

Female (n=13). Wingspan: 10.0-11.0 mm. Frenulum with two acanthae. Sternum VII with conspicuous pattern of scale sockets; posterior margin medially produced into a rounded lobe bearing minute spines. Female genitalia (n=2) (fig. 27).

Papillae anales elongate and pointed, but not strongly melanized apically. Posterior and anterior apophyses slender and straight; anterior apophyses shorter than posterior apophyses, connected dorsally by slightly more melanized band along apical margin of tergum VIII. Ostium bursae near anterior margin of sternum VIII medially, surrounded by dorso-ventrally flattened and anteriorly projecting sclerotized structure. Ductus bursae slender, elongate, with a pair of short and elongate sclerotized patches before corpus bursae. Inception of ductus seminalis on corpus bursae beside connection with ductus bursae. Corpus bursae elongate, with a pair of rather large signa near middle; each signum a rounded plate with short inwardly directed crest.

Etymology. Named for the Galápagos Islands, where the type locality is located and from where all the known specimens were collected.

Biology. Moths were observed flying around *Eleocharis mutata* (L.) Roem. & Schult. (Cyperaceae) growing in small pools of brackish water, and leaves with mines and larvae were collected. Eight adults emerged and were pinned. All other specimens were collected from January to May, at light, from sea level to the highest elevations on the three islands where the species was found. According to Wiggins & Porter (1971) the host plant occurs on Isabela, San Cristóbal, and Santa Cruz. It is also widespread in tropical America, from the West Indies to Brazil. It grows in shallow pools of fresh water, but occasionally in saline habitats.

Distribution. Possibly endemic to the Galápagos where it was found on the islands of Isabela, San Cristóbal, and Santa Cruz.

Cosmopterix attenuatella (Walker) Figs 4, 15, 16, 28

Gelechia attenuatella Walker, 1864: 1019; Riedl, 1969: 727, figs 46, 202, 290, 372; Hodges, 1978: 26, pl. 2, figs 25, 26, text figs 5g, 19c; Becker, 1984: 43; Edwards & Nielsen, 1996: 102.

Cosmopteryx [sic] *flavofasciata* Wollaston, 1879: 438; Fletcher, 1933: 1-2; Common, 1990: 255, fig. 25.2.

Cosmopteryx [sic] *mimetis* Meyrick, 1897: 339; Fletcher, 1920: 102.

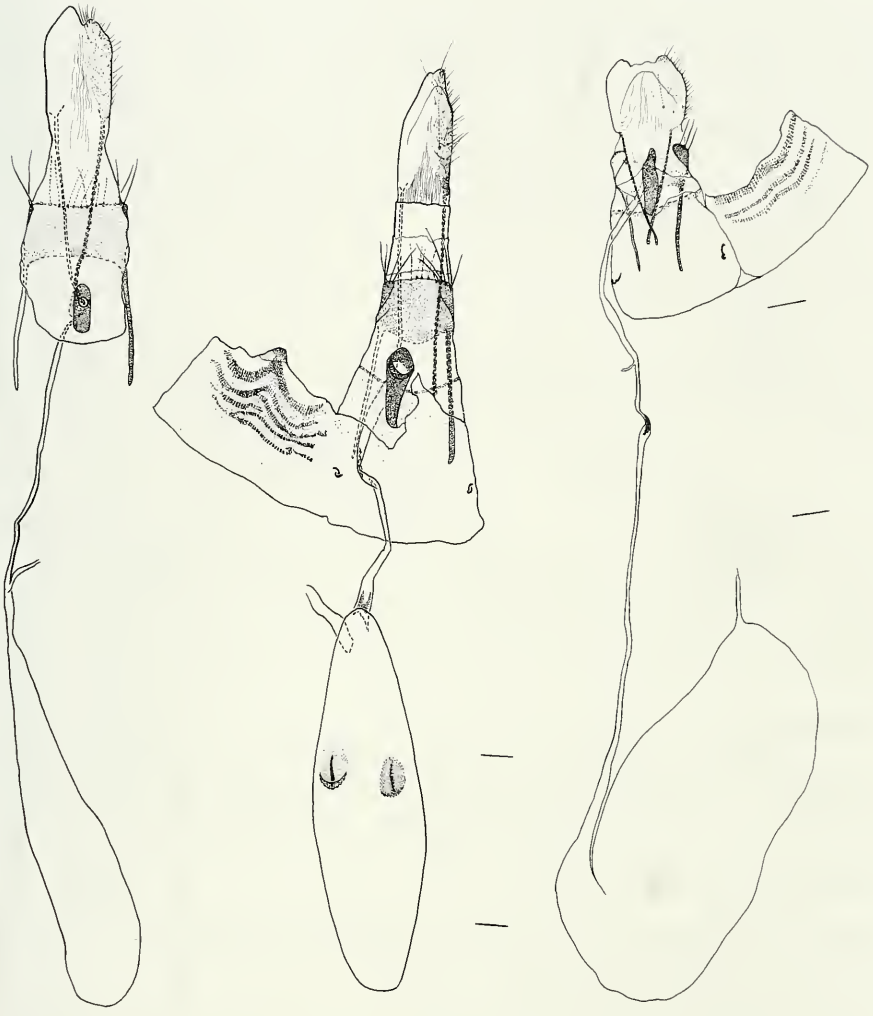
Cosmopteryx [sic] *apiculata* Meyrick, 1922: 568; Clarke, 1965: 486, pl. 239, figs 1-1b; Becker, 1984: 43. **New synonym.**

Cosmopteryx [sic] *antillia* Forbes, 1931: 356, pl. 42, fig. 6.

Cosmopteryx [sic] *superba* Gozmány, 1960: 419, fig. 4A.

Diagnosis. This species can be separated readily from its three Galápagos congeners by the united band formed by the shining spots at the base of the forewing fascia (fig. 4). On average, this is the smallest of the four Galápagos *Cosmopterix* species; the wingspan of the males (n=45) varies from 7.0 to 9.0 mm, and the wingspan of the females (n=24) is between 7.5 to 9.5 mm. The moths also appear generally darker than the other three species. The male genitalia (figs 15, 16) are characterized by the slender and apically pointed aedeagus. In the female genitalia (fig. 28), the ostium bursae is in a narrow sclerotized tube extended and enlarged anteroventrally, the corpus bursae is large and without signum, and the ductus bursae connects with the corpus bursae at its anterior end.

Biology. The larva is a miner in leaves of *Cyperus* species (Cyperaceae). The account of the biology of *C. flavofasciata* by Fletcher (1933), also mentioned by Hodges (1978), is a translation from Chrétien (1917), who was referring to *Cosmo-*



FIGS 26-28
Female genitalia of *Cosmopterix* species (scales = 0.5 mm). 26. *C. madeleinae*; 27. *C. galapagosensis*; 28. *C. attenuatella*.

pterix crassicervicella Chrétien. *Cosmopterix crassicervicella* is listed as a synonym of *C. attenuatella* by Fletcher (1933), but not by Hodges (1978) or Edwards and Nielsen (1996). *Cosmopterix crassicervicella* is in fact a valid species, restricted to the Mediterranean region (J.C. Koster, pers. comm.). A short description of the biology and larva of *C. mimetis* (a true synonym of *C. attenuatella*) is provided by Fletcher (1920). Larvae were found on leaves of "motha grass" (*Cyperus rotundus* L.). They are 3 mm long and uniformly light yellow. They mine either in the middle or in the apical part of the leaf, the mine running along and on either side of the midrib. *Cyperus rotundus* is also called "corocillo," nut grass, and purple nutsedge. It is a cosmopolitan weed also found in the Galápagos island of San Cristóbal (Wiggins & Porter, 1971).

Cosmopterix attenuatella has not been reared in the Galápagos. Moths were collected at light from January to May and in October, from sea level to the highest elevations on several islands. Some specimens were swept from the vegetation in the day time.

Distribution. Pantropical. Fernandina, Isabela, Santa Cruz, San Cristóbal, Santiago.

Remarks. I have studied the lectotype of *C. apiculata* Meyrick (designated by Clarke, 1965) and found it to be identical to *C. attenuatella* Walker. Meyrick (1922) indicates a close relationship between *C. apiculata* and *C. pentachorda* Meyrick, but this is untenable when the genitalia are examined. The synonymy was confirmed by J.C. Koster (pers. comm.).

Pyroderces Herrich-Schäffer

This rather large genus containing some 80 known species is mostly distributed in the tropical, subtropical, and warm temperate parts of the Old World. Three species occur in the New World (Hodges, 1978; Becker, 1984).

Pyroderces rileyi (Walsingham) Figs 5, 17, 18, 32

Batrachedra rileyi Walsingham, 1882: 198; Howard, 1896: 348; Howard, 1897: 29; Dyar, 1902: 534; Walsingham, 1906: 179; Swezey 1909: 22, pl. 3, figs 9-11; Chittenden, 1916: 1-20, figs 1-7, pls 1-4.

Pyroderces rileyi; Durrant, 1912: 207, fig. 3; Berger, 1917: 71; Busck, 1917: 362-366, 370, figs 5-7, pls 7, 8, 10-12; Heinrich, 1921: 820-821, pls 102, 103, 105-107; Williams, 1931: 158, pl. 27, figs 9-11; Silvestri, 1943: 247-250, figs 307-309; Peterson, 1948: 136, pl. L13, figs Q-U; Hodges, 1978: 47, pl. 3, figs 29, 30, text figs 2d, 8h, 23h; Hinton, 1981: 235; Becker, 1984: 44; Common, 1990: 254; Pierce, 1995: 433; Edwards & Nielsen, 1996: 103.

Sathrobrota rileyi; Hodges, 1962: 74, figs 59, 117, 169; Riedl, 1969: 742, figs 55, 210, 297, 383.

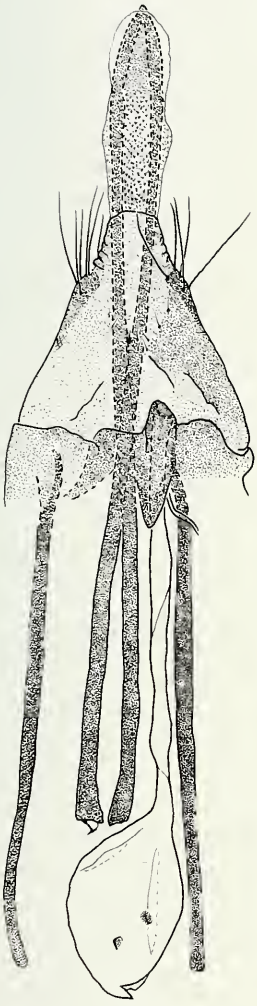
Anatrachyntis rileyi; Zimmerman, 1978: 1044, figs 64, 219, 733, 736, 739, 740, 742, 743, 744.

Batrachedra stigmatophora Walsingham, 1897: 104.

Pyroderces stigmatophora; Meyrick, 1914: 203

Anatrachyntis stigmatophora; Meyrick, 1915: 326.

Diagnosis. In the Galápagos Islands, this species may be considered roughly similar to the *Cosmopterix* species, but its wing pattern (fig. 5) and genitalia are very distinctive (figs 17, 18, 32).



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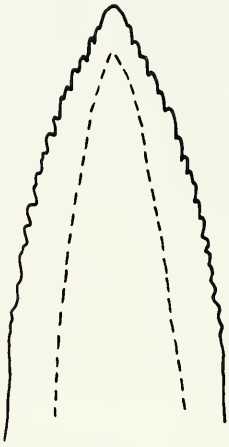

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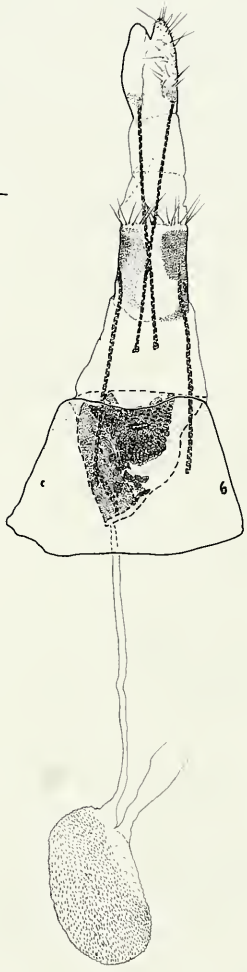

32

FIGS 29-32

Female genitalia of Cosmopterigidae species. 29-31. *Ithome volcanica*: 29. Whole genitalia; 30. Papillae anales; 31. Corpus bursae, natural shape. 32. *Pyroderces rileyi* (scale = 0.5 mm).

Biology. The caterpillar has been reported as a scavenger in dead plant material, but also as a leaf-miner and eating seeds or fruits on their surface or inside (Zimmerman, 1978), and as a predator of scale insects (Pierce, 1995). It has been reported to feed on dasheen (*Colocasia esculenta* (L.) Schott, Araceae), pineaple (*Ananas comosus* (L.) Merr., Bromeliaceae), flowers of castorbean (*Ricinus* species, Euphorbiaceae), flowers of bushmint (*Hyptis* species, Lamiaceae), cotton seed and rotten cotton bolls (*Gossypium* species, Malvaceae), milo maize grain (*Sorghum vulgare* Pers.), stems, husks, and tassels of corn (*Zea mays* L.) (Poaceae) (Hodges 1978). Zimmerman (1978) added: aloe (*Aloe* species, Aloaceae), many kinds of old leguminous pods and tamarind (*Lysiloma* species), and raintree (or saman, *Samanea saman* (Jacq.) Merr.) (Fabaceae), banana (*Musa paradisiaca* L., Musaceae), dead panic grass (*Panicum* torridum Guad., Poaceae), coffee beans and cherries (*Coffea* species, Rubiaceae), *Rochea* species (= *Crassula*, Crassulaceae), Hawaiian soap-tree (*Sapindus oahuensis* Hildebr. ex Radlk., Sapindaceae), eggplant (*Solanum melongena* L., Solanaceae), and others.

I have seen three specimens from the Galápagos. They were reared from stems of white mangrove (*Laguncularia racemosa* (L.) Gaertn. *f.*, Combretaceae) by C. Causton, in April 1999, and by T. Paulson, in July 2000. The twigs from which the moths were reared were infested with the cottony cushion scale (*Icerya purchasi* Maskell, Margarodidae). The caterpillars appeared to feed on eggs and larvae of the scales (L. Roque, pers. comm.). White mangrove is found on the shores of tropical America, in West Africa, and on several Galápagos Islands (Wiggins & Porter, 1971). Pierce (1995) mentioned that *Pyroderces rileyi* is an obligatory predator on scale insects (including *I. purchasi*). This false assertion is based on Berger (1917) who wrote that "the caterpillars are regularly found feeding on the cottony cushion scale" and on Hinton (1981) who mentioned that the caterpillar is "an occasional predator" of *Coccus* and *Pseudococcus*.

Busck (1917), Heinrich (1921), and Zimmerman (1978) have illustrated the larva and pupa.

Distribution. Widely dispersed in the warm and tropical regions of the World (Zimmerman, 1978). Undoubtedly introduced to the Galápagos where it is known only from the CDRS and Puerto Ayora, Santa Cruz.

Remarks. Common names for this species are the pink cornworm, the pink bud moth, and the pink scavenger caterpillar (Zimmerman, 1978).

Ithome Chambers

Ithome is distributed in the New World from Tennessee and North Carolina in the United States to Peru and the Amazon Basin of Brazil (Hodges, 1978). It contains 18 described species, including the following.

Ithome volcanica sp. n. Figs 6, 19-21, 29-31

Holotype ♂, Ecuador: Galápagos, Isabela, Tagus Cove, 13.v.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22683).

Paratypes, Ecuador: 27 ♂, 37 ♀, from the Galápagos Islands, collected at MVL by B. Landry, except as indicated. *Española*: 3 ♂ (slide BL 1139), 8 ♀, Bahía Manzanillo,

25.iv.1992; 1 ♀, same locality, 29.iv.1992; 1 ♂, 1 ♀ (slide BL 1217), Las Tunas Trail, 100 m elev., 30.iv.1992; 2 ♀, Punta Suarez, 2.v.1992. *Floreana*: 3 ♀ (slide BL 1220), Punta Cormoran, 21.iv.1992; 1 ♂, Finca Las Palmas, Zona Arida, 300 m, 26.xii.1997, UVL-F[luorescent] L[ight] (L. Roque). *Isabela*: 6 ♂ (CNC slide MIC 4687), 2 ♀, Puerto Villamil, 2.iii.1989; 2 ♂, 1 km W Puerto Villamil, 3.iii.1989; 1 ♂, 2 ♀, 2 km W Puerto Villamil, 5.iii.1989; 1 ♂, 3 km N Santo Tómas, Agriculture Zone, 8.iii.1989; 1 ♂, 11 km N Puerto Villamil, 9.iii.1989; 1 ♂, 2 ♀, 8.5 km N Puerto Villamil, 11.iii.1989; 1 ♂ (slide BL 1219), 1 ♀, same data as holotype; 1 ♂, Volcan Darwin, 300 m elev., 15.v.1992. *Pinta*: 1 ♀ (slide BL 1275), Plaja Ibbetson, 13.iii.1992; 1 ♀, Arid Zone, 15.iii.1992. *San Cristóbal*: 2 ♀ (CNC slide MIC 4686), Puerto Baquerizo, 17.ii.1989. *Santa Cruz*: 1 ♂, 5 ♀, C[harles] D[arwin] R[esearch] S[tation], Arid Zone, 17.i.1989; 1 ♀, same locality, 19.i.1989; 2 ♂ (slide BL 1218), 1 ♀, same locality, 3.ii.1989; 1 ♀, same locality, 6.iii.1992, U[ltra] V[iolet] L[ight]; 1 ♂, same locality, 7.iii.1992, UVL; 1 ♀, 4 km N Puerto Ayora, 20.i.1989; 1 ♂, Tortuga Bay, 29.i.1989; 1 ♂, 1 ♀, Tortuga Reserve, W Santa Rosa, 6.ii.1989; 1 ♀, Finca S[teve] Devine, 17.iii.1989. *Seymour Norte*: 2 ♂ (slide BL 1276), 29.iii.1992. (CNC, ECCD, MHNG, BLC, BMNH, USNM).

Material excluded from type series. Nine specimens without abdomen that were collected at the same places and dates as some of the paratypes, except for two, collected on Marchena, on 23 March 1992.

Diagnosis. Other than *I. volcanica*, no narrow-winged gelechioids in the Galápagos are known to have shining black forewings with a thin pale yellow transverse bar (although sometimes incomplete) subapically. The two species of *Periploca* treated here and some species of Scythrididae may appear similar in color and size, but they are dark grey, lack subapical pale-yellow markings, and are usually a little bigger than *I. volcanica*. In addition, the males of *I. volcanica* can be recognized without dissecting by the presence of a bunch of long pale-yellow scales on each side of the abdomen apically.

Description. MALE (n=28) (figs 6, 19-21). Head shining, grey on face, dark brown dorsally. Haustellum pale grey. Labial palpus pale grey on dorsal edge, black elsewhere with a few white scales along ventral edge and apex of third segment. Antennal scape dark greyish brown except for off-white apical row of scales, with a one-scale pecten (although rarely two scales are present); flagellum basally dark greyish brown, changing to pale grey from middle. Thorax dark brown, almost black, with a slight shine. Legs medially off-white to pale yellow. Laterally, foreleg dark brown on coxa with white to yellowish-white spots at apex of femur, beyond middle and at apex of tibia, and at apex of tarsomeres I, II, and V. Midleg laterally dark brown except for pale-grey and beige coxa, and white to pale-yellow spots at apex of femur (made of 1-2 scales usually), beyond middle and at apex of tibia, and at apex of all tarsomeres. Hindleg laterally dark brown except for off-white coxa and tibial spines, and pale yellow to white at base of tibial spines, crest of elongate scales on dorsal edge of tibia, apex of tarsomeres I-IV, and all of tarsomere V. Wingspan: 7.0-8.0 mm. Forewing dark brown, almost black, with more or less conspicuous pale-yellow markings as a small spot on cubital fold medially, a smaller spot (sometimes absent) slightly more costal and posterior, and a subapical transverse line sometimes disconnected in middle; fringe pale greyish beige. Hindwing pale greyish brown; costal fringe greyish brown, with a few shorter and wider pale greyish-brown to beige scales subbasally, dorsal fringe pale yellowish to greyish brown. Abdomen beige with greyish brown in middle of some terga, to mostly greyish brown; base of genitalia laterally with bunch of pale-yellow scales projecting beyond genitalia. Margins of

sternite VII heavily melanized (fig. 21); posterior margin concave in middle and laterally produced into wide but short lobes. Lateral membrane of segment VII with a pocket of elongate pale-yellow scales apically. Tergum VII not modified, broadly convex apically. Tergum VIII broadly convex; posterior margin slightly excavated medially; median sclerotized rod very thin, almost reaching middle of segment VII, with two thin and short (although variable in length) branches at anterior end. Sternum VIII asymetrical basally, with pair of long and narrow anteriorly directed sclerotized rods; right "segment" short, tapering to rounded apex, medially with short and broad projection terminated by short spine; left "segment" short, apically blunt, basally with long, narrow, glabrous, and apically rounded and slightly enlarged projection.

Male genitalia (n=5) (figs 19-21). Uncus of medium length, narrow, apically pointed. Arms of tegumen very narrow, slightly larger toward base. Subscaphium moderately melanized. Membrane on each side of subscaphium with 4-5 thin setae on each side. Membrane below subscaphium produced anteriorly into a triangular, apically rounded pocket with deciduous, pointed scale-like setae of medium length. Right valva a short rounded knob with few short setae apically. Left valva medium sized, elongate, directed upward, slightly curved, slightly hooked apically, with few short setae medially. Both valvae with short antero-basal projection, longer on left side, connected to short "vinculum." Juxta a short and narrow plate connecting vinculum and base of aedeagus ventrally. Aedeagus narrow, with submedian left curve followed by right curve, pointing slightly to right, basally blunt, dorsal margin forming sharp and narrow point apically; vesica without cornuti.

Female (n=37). Wingspan: 8.0-9.0 mm. Antennal flagellomeres more slender than those of the male. Frenulum with three acanthae. Female genitalia (n=4) (figs 29-31). Papillae anales strongly melanized, dorsoventrally compressed, serrated on lateral margins, fused and pointed apically. Intersegmental membrane between papillae and segment VIII spinulate. Posterior apophyses straight, wide, extending beyond segment VI, slightly enlarged apically, bluntly terminated, perfectly circular in cross section. Segment VIII posterolaterally more strongly melanized, bearing few long setae; with a few short setae ventrally near middle. Anterior apophyses straight, narrower than posterior apophyses, extending to segment IV, terminated as posterior apophyses. Ostium bursae in middle of glabrous sterigma fused to posterior margin of sternite VII. Sterigma a rather wide but short plate with a short tube projecting posteriorly in middle, and with a cone-shaped and apically rounded flap of medium length projecting anteriorly in the middle. Ductus bursae parallel sided throughout length, extending to segment V. Ductus seminalis connecting on ductus bursae near ostium. Corpus bursae small, elongate, laterally compressed, with pair of short crest-shaped signa.

Etymology. The specific epithet refers to the geologic nature of the Galápagos Islands, and to the similarity in color of the moth's forewings with the color of several lava fields I have seen in the archipelago.

Biology. The host plant is unknown. Caterpillars of other species of *Ithome* are known to feed on flowers of Fabaceae and Polygonaceae. *Ithome concolorella* (Chambers) has been accidentally introduced into Hawaii where it has become a pest

on *Acacia farnesiana* (L.) Willd. and *Prosopis chilensis* (Mol.) Stuntz (Hodges, 1978). Specimens of *I. volcanica* were collected at light from December to May, from the littoral to the agriculture zones, but especially at lower elevations.

Distribution. Apparently endemic: Española, Floreana, Isabela, Marchena, Pinta, San Cristóbal, Santa Cruz, Seymour Norte.

Remarks. I have based my description of the male's abdominal segment VIII and genitalia on Hodges' (1978) interpretations of these structures. However, the fusion and asymetry shown in this species, as well as the absence of a published comprehensive morphological study, make the identification of these structures difficult. Therefore, I am not certain that I have correctly interpreted the valvae, the elongate basal projection of sternum VIII's left "segment" (or sclerite of Hodges, 1978), the antero-basal projections of the "valvae," and the vinculum.

Periploca Braun

Previously recorded from Canada and the United States only and known to include 27 described species (Hodges, 1978), *Periploca* is reported for the first time from the Neotropical Region on the basis of the two new species described below.

Periploca longipenis sp. n. Figs 7, 22, 25

Holotype ♂, Ecuador: Galápagos, Isabela, Tagus Cove, 13.v.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22684).

Paratypes, Ecuador: 3 ♂, 15 ♀ collected in the Galápagos at MVL (except otherwise indicated) by B. Landry. *Isabela*: 1 ♂ (CNC slide MIC 4676), 2 ♀, 1 km W Puerto Villamil, 3.iii.1989; 1 ♂, 2 ♀, 8.5 km N Puerto Villamil, 11.iii.1989; 3 ♀ (slide BL 1279), same data as holotype; 1 ♀, Volcan Darwin, 300 m elev., 15.v.1992; 2 ♀ (slide BL 1277), Volcan Darwin, 300 m elev., 20.v.1992. *Santa Cruz*: 1 ♂ (CNC slide MIC 4703), Tortuga Reserve, W Santa Rosa, 6.ii.1989; 3 ♀ (slide BL 1278), Estacion Cientifica Charles Darwin, 6.iii.1992, U[ltra] V[iolet] L[amp]; 1 ♀, Estacion Cientifica Charles Darwin, 7.iii.1992, UVL; 1 ♀, Bahía Conway, 14.iv.1992. (CNC, BLC, MHNG, BMNH, ECCD, USNM).

Diagnosis. In the Galápagos islands, this species is superficially similar to species of Scythrididae, *Ithome volcanica*, and *Periploca darwini*. The Scythrididae all have a pecten made of several scales whereas the pecten of the Galápagos *Periploca* species is made of a single basal scale. *Ithome volcanica* differs in forewing pattern from the *Periploca* species by the presence of a pale-yellow subterminal line. The males of the two *Periploca* species can be separated easily by features of the male genitalia, especially the very long aedeagus protruding off the tip of the abdomen in *P. longipenis*. There are also some subtle differences in wing pattern between the two species; for example, the forewing ground color appears more uniformly greyish brown in *P. longipenis* and it usually has numerous dark-brown spots of raised scales, whereas the forewing ground color in *P. darwini* has paler, almost white, areas and a darker brown base, and there are only two small dark-brown spots of unraised scales.

Description. MALE (n= 4) (figs 7, 22). Head scales brown to greyish brown, beige tipped, slightly shining. Haustellum scales greyish brown, tipped off-white. Labial palpus dark greyish brown, almost black laterally, medially with scales greyish

brown at base and white apically; third segment about as long as second. Ocellus present. Antennal scape mostly dark greyish brown, with scales only slightly beige tipped, except at apex, more prominently beige tipped; pecten's unique scale narrow, basally yellowish beige, dark greyish brown in middle, apically off-white to white and pointed, obtuse, or notched; flagellum greyish brown, darker and with beige-tipped scales on basal few (4-5) segments, with raised scales from about 1/3. Thorax mostly concolorous with head, but with dark greyish-brown spot apically on mesothorax, and greyish beige on metathorax. Leg scales greyish brown, slightly beige or off-white tipped. Foreleg tibia with beige rings at 1/3, 2/3, and apically; tarsomeres beige ringed apically; scales more conspicuously beige tipped on tarsomere I. Midleg tibia with beige rings in middle, subapically, and apically; tarsomeres beige ringed apically. Hindleg tibia beige ringed at base of median pair of spines and apically, with dorsal crest of elongate scales pale greyish brown to yellowish brown apically; tarsomeres apically beige tipped. Wingspan: 8.5-10.0 mm. Forewing ground color uniformly mouse grey, varying in shades, with dark-brown (almost black) spots of raised scales; most scales greyish brown, tipped off-white; with a slight bluish-grey tinge at base; with a few to about 50 evenly dispersed small spots of completely dark-brown scales, except at base; with a bigger dark-brown spot followed by white-tipped scales in cubital fold before middle; with another slightly smaller dark-brown spot preceded by white-tipped scales along mid-line at about 2/3 wing length; apex with most scales raised and more conspicuously tipped off-white; fringe pale greyish brown. Hindwing uniformly greyish brown; fringe pale greyish brown to pale yellowish brown. Abdomen without scent gland between segments II and III; segments dorsally greyish brown with paler greyish-beige apical margin; ventrally with a large median band of pale greyish-beige scales paler at tip; laterally with scales greyish brown tipped with white. Segment VIII dorsally very narrow, laterally with short lobes bearing a few elongate pale yellowish brown with pale yellow tip scales, ventrally produced and conical.

Male genitalia (n=2) (fig. 22). Tegumen very narrow for whole length, asymmetrical, the right side shorter, twisted to point to the left because of the protruding aedeagus. Vinculum narrow, fused with base of valvae. Manica (? juxta) an inverted "J." Valvae asymmetrical, with a medium-sized base and a narrow medial arm; left valva shorter, base with short lateral projection pointing apically, arm gently pointed; right valva's base without projection, arm apically rounded, slightly bent laterally. Aedeagus about twice length of valva, narrow, spiralled twice, gradually narrowing to a point, without spines; vesica without cornuti.

Female (n=15). Wingspan: 8.5-10.0 mm. Antennal flagellomeres narrower than in males. Frenulum with three acanthae. Female genitalia (n=3) (fig. 25). Papillae anales dorsoventrally flattened, apically fused, strongly melanized, and blunt. Apophyses of equal length and of medium girth; posterior apophyses curved anteriorly; anterior apophyses straight, connected sub-basally by narrow band. Ostium bursae in medium-sized funnel at base of sternite VII medially, slightly melanized inside funnel. Intersegmental membrane VI-VII with large well melanized and V-shaped pocket holding a bunch of short specialized scales on each side. Posterior margin of sternum VI slightly concave medially. Ductus bursae shortly membranous,

subsequently sclerotized in an almost complete spiral followed with membranous but scobinated section. Ductus seminalis connecting on ductus bursae on membranous base. Corpus bursae separated into basal unscobinated section and apical, narrower and shorter scobinated section, without signa.

Etymology. Derived from the Latin *longus* and *penis*, and referring to the very long aedeagus of the male.

Biology. The host plant and immature stages are unknown. Moths are attracted to light and were collected from sea level to 300 meters in elevation, from February until May. Many *Periploca* larvae are associated with junipers (*Juniperus*, Cupressaceae), one species makes stem galls on *Ceanothus* (Rhamnaceae), and another bores in the thorns of honey locust (*Gleditschia triacanthos* L., Fabaceae) (Hodges, 1978).

Distribution. Possibly endemic to the Galápagos, where it was collected on Isabela and Santa Cruz.

Remarks. In this species and the next I believe that the vinculum is a very narrow band and that segment VIII is variable in size and shape. This interpretation seems to contradict Hodges (1978) but it is supported by an examination of the sequence in which the structures are found and by the presence of scales and setae on segment VIII. Because of the two *Periploca* species' strong superficial similarity, there is a possibility that some of the females associated with the males of this species belong to the following species. However, because of the very strong differences in male genitalia between these two species and the known variation in the female genitalia in this genus (see Hodges, 1978), this possibility is very small.

Periploca darwini sp. n. Figs 8, 23, 24

Holotype ♂ (dissected, BL 1149), Ecuador: Galápagos, Isabela, V[olcan] Darwin, 1000 m elev., 18.v.1992, M[ercury] V[apor] L[amp] (B. Landry), (CNC type no. 22685).

Paratype. *Isabela*: 1 ♂ (BL slide 1282), Volcan Darwin, 630 m elev., 16.v.1992, MVL (B. Landry) (MHNG).

Diagnosis. The diagnosis provided for *P. longipenis* is useful also for *P. darwini*.

Description. Male (n=2) (figs 8, 23, 24). Head scales greyish brown to dark brown tipped white or greyish white, wider scales along midline more evenly colored greyish brown with only a slightly paler tip and with a bronze shine. Haustellum scales pale greyish brown tipped greyish white. Labial palpus dark brown with scales slightly paler at base, with a few white scales at base of second segment; medially paler greyish brown, with white-tipped scales; third segment about as long as second. Ocellus present. Antennal scape mostly dark greyish brown with scales slightly paler tipped, apical scales more conspicuously white tipped; single scale of pecten narrow, mostly pale, off-white, pale greyish-brown near middle, notched or pointed apically; flagellum greyish brown, slightly darker brown on first 2-3 segments, with raised scales from before middle. Thorax mostly dark greyish brown with a bronze shine, dark scales only slightly paler apically, greyish white; metathorax pale greyish white. Legs laterally with dark-brown scales tipped paler off-white or greyish white, medially uniformly pale greyish white. Foreleg tibia with three off-white rings, sub-

basally, medially, and apically; tarsomeres apically ringed off-white. Midleg with scales conspicuously tipped white; tarsomeres apically ringed off-white. Hindleg tibia with ring of paler greyish brown white-tipped scales at base of median set of spines, dorsal crest of scales of medium length, pale greyish beige; tarsomeres apically ringed off-white. Wingspan: 8.5-9.5 mm. Forewing scales mostly greyish brown, with or without white apically, some scales completely dark brown and others white; with a bronze tinge on mostly greyish-brown base; mostly white from about 1/6 to 1/3 and on inner half at about 2/3; with raised scales on apical 1/3; with two small dark-brown spots, one in cubital fold submedially, the other in middle postmedially; also with small inconspicuous darker spots along inner margin on apical third and at apex; fringe pale greyish brown. Hindwing pale greyish brown with concolorous fringe. Abdomen without scent gland between segments II and III; segments dorsally pale greyish beige with slightly paler posterior margin; ventrally with scales greyish brown except for their white base and apex. Segment VIII very narrow dorsally and ventrally; enlarged laterally and bearing numerous pointed scales of medium length and pale yellowish white.

Male genitalia (n=2) (figs 23, 24). Intersegmental membrane before genitalia with rather wide and short bumps bearing numerous pointed scales of medium length. Tegumen and vinculum narrow, symmetrical, not produced. Manica (?juxta) protruding anteriorly and attached to base of aedeagus, about 1/3 length of valva. Valvae asymmetrical, each with a pair of elongate arms bearing short and stout setae apically, especially on medial arm; left valva divided at midlength in two arms of about same length and shape, and rather narrow and narrowly rounded apically, also with a short bump bearing a long seta ventrally near middle; right valva's medial arm in continuity with broad base and rather heavily melanized, base with a long seta ventrolaterally, lateral arm arising dorsolaterally from base, down-curved, narrow, slightly shorter and not as strongly melanized as medial arm. Aedeagus coming through manica above right valva, about as long as valva + juxta, slightly down-curved, dorsally with long slit arising almost from base, apically pointed, without spines; vesica with minute, slender cornuti.

FEMALE. Unknown.

Etymology. The specific epithet refers to the name of the type-locality, Volcan Darwin, which in turns refers to the name of the father of modern evolutionary thought, Charles Darwin, who visited the Galápagos in 1835. Darwin actually landed on four of the Galápagos Islands, including Isabela, at Tagus Cove, at the base of Volcan Darwin (Sulloway, 1984).

Biology. The host plant and immature stages are unknown. The only two specimens known were collected at light, in May, at elevations of 630 and 1000 m on Volcan Darwin, Isabela.

Distribution. Possibly endemic to the higher parts of Isabela, the largest of the Galápagos Islands.

Remarks. The two known specimens of *P. darwini* do not appear to be very fresh. Consequently, the diagnostic features of the forewing pattern and color may show differently when other specimens become available for study.

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